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BEFORE THE ARIZONA CORPORATION COMMISSION

MARC SPITZER
CHAIRMAN
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
MIKE GLEASON
KRISTIN K. MAYES

In the matter of the Application of)	Docket No. E-01345A-03-0437
ARIZONA PUBLIC SERVICE COMPANY)	
for a Hearing to Determine the Fair Value of the)	
Utility Property of the Company for Ratemaking)	
Purposes, to Fix Just and Reasonable Rate of)	NOTICE OF FILING
Return Thereon, to Approve Rate Schedules)	TESTIMONY
Designed to Develop Such Return, and for)	
Approval of Purchased Power Contract.)	

Western Resource Advocates, through its undersigned counsel, hereby provides notice that it has this day filed the written testimony of David Berry in connection with the above-captioned matter.

Arizona Corporation Commission

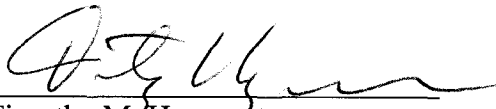
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1 DATED this 27th day of September, 2004.

2 ARIZONA CENTER FOR LAW IN
3 THE PUBLIC INTEREST

4 By 
5 Timothy M. Hogan
6 202 E. McDowell Rd., Suite 153
7 Phoenix, Arizona 85004
8 Attorneys for Western Resource Advocates

9 ORIGINAL and 13 COPIES of
10 the foregoing filed this 27th day
11 of September, 2004, with:

12 Docketing Supervisor
13 Docket Control
14 Arizona Corporation Commission
15 1200 W. Washington
16 Phoenix, AZ 85007

17 COPIES of the foregoing
18 transmitted electronically
19 this 30th day of March, 2004, to:

20 All Parties of Record
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22
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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

MARC SPITZER, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION
OF ARIZONA PUBLIC SERVICE COMPANY
FOR A HEARING TO DETERMINE THE
FAIR VALUE OF THE UTILITY PROPERTY
OF THE COMPANY FOR RATEMAKING
PURPOSES, TO FIX A JUST AND
REASONABLE RATE OF RETURN
THEREON, TO APPROVE RATE
SCHEDULES DESIGNED TO DEVELOP
SUCH RETURN, AND FOR APPROVAL OF
PURCHASED POWER CONTRACT.

DOCKET NO. E-01345A-03-0437

Testimony of

David Berry
Western Resource Advocates

September 27, 2004

Regarding the Proposed Settlement of

Docket No. E-01345A-03-0437

Arizona Public Service Company

Request for Rate Adjustment

Testimony of David Berry
Docket No. E-01345A-03-0437
September 27, 2004

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1 **Introduction**

2
3 Q. Please state your name and business address.

4
5 A. My name is David Berry. My business address is P.O. Box 1064, Scottsdale, Arizona
6 85252-1064.

7
8
9 Q. By whom are you employed?

10
11 A. I am Senior Policy Advisor with Western Resource Advocates (WRA).

12
13
14 Q. Did you previously file testimony in this matter?

15
16 A. Yes. I filed direct testimony on February 3, 2004 and cross-rebuttal testimony on
17 March 30, 2004.

18
19
20 Q. What is the purpose of your testimony?

21
22 A. My testimony describes why the settlement agreement is in the public interest and in
23 particular addresses Section VIII of the agreement (paragraphs 69 through 72)
24 pertaining to renewable energy.

25
26
27 Q. Did you participate in the settlement negotiations?

28
29 A. Yes. I attended all settlement conferences and worked with other parties to the case
30 to arrive at an agreement.

31
32
33 Q. Does WRA support the settlement agreement?

34
35 A. Yes.

36
37
38 Q. What is WRA's principal objective in this matter?

39
40 A. WRA's primary objective is to start Arizona Public Service Company (APS) on a
41 path that will hedge the high and volatile prices of natural gas with low cost, stably
42 priced renewable energy.
43

Hedging High Natural Gas Prices with Renewable Energy

Q. Please summarize your direct testimony with regard to hedging high natural gas prices with low cost renewable energy.

A. On pages 2 through 14 of my direct testimony, I found that APS relies on natural gas as a fuel for its intermediate and peaking power resources and that natural gas prices are volatile and increasing over time. As a result, rates will go up as gas prices go up. I further argued that APS should hedge against high natural gas prices by acquiring large amounts of low cost renewable energy to displace gas generation and that doing so would lower APS' fuel and purchased power costs in periods of moderate or high gas prices. I recommended that the Commission order APS to immediately acquire energy to meet at least 2 percent of its retail sales from low cost renewable energy resources and that the Commission undertake a process to establish a renewable portfolio standard well in excess of the current Environmental Portfolio Standard (EPS).

Q. Have you updated your exhibit on natural gas prices paid by electric utilities?

A. Yes. Exhibit DB-5 updates Exhibit DB-2 in my direct testimony, making use of more recent Energy Information Administration price data for 2003 and 2004 and more recent Gross Domestic Product Implicit Price deflators.¹ Exhibit DB-5 is presented in constant year 2004 dollars. Exhibit DB-5 shows the long run trend of increasing real gas prices (increasing at about 3 percent per year) and the volatility of gas prices paid by the US power industry.

Q. Has APS provided information about the effect of gas price increases on its costs?

A. Yes. Peter Ewen (page 5, lines 21 through 24 of his rebuttal testimony) states the following: "An upward move of \$1/MMBTU in natural gas prices (with a corresponding increase in power prices of \$8/MWH that maintains the average 'spark spread' at roughly current levels) translates into an additional cost to serve retail customers of about \$55 million in 2004 and almost \$65 million in 2005."

Q. What conclusions do you draw regarding natural gas costs?

¹ Energy Information Administration, *Short Term Energy Outlook, August 2004*, Table 4. Energy Information Administration, *Annual Energy Review 2002*, Table 6.8. Energy Information Administration, *Natural Gas Annual 2002*, Table B2. Bureau of Economic Analysis, National Income and Product Accounts Table 1.1.4, Price Indexes for Gross Domestic Product, through 2004, Quarter II.

1 A. APS and its ratepayers have a significant exposure to high natural gas costs. Low
2 cost, stably priced renewable energy is a readily available tool for hedging against
3 higher gas prices over the long run.
4

5
6 **Settlement Agreement Provisions Concerning Acquisition of Renewable Energy**
7

8 Q. Does the settlement agreement foster the acquisition of low cost, stably priced
9 renewable energy as a hedge against high natural gas prices?
10

11 A. Yes. According to paragraph 69, APS will issue a special request for proposals in
12 2005 seeking at least 100 MW and 250,000 MWh per year of energy from renewable
13 resources (solar, biomass/biogas, wind, small hydro, hydrogen, and geothermal
14 resources) with delivery beginning in 2006. APS will also seek to obtain at least 10
15 percent of its increases in peak capacity needs from renewable resources, using either
16 the request for proposals or subsequent solicitations (§ 69). APS' total peak
17 requirements typically increase by about 300 to 350 MW per year. Meeting 10
18 percent of these increases with renewable resources would add about 30 to 35 MW of
19 renewable resources per year.
20

21 Under the terms of the settlement agreement:
22

- 23 • Energy from renewable resources will be obtained via long term purchased power
24 agreements of 5 to 30 year duration (§ 69e).
- 25 • Energy from renewable resources must be deliverable to APS' system (§ 69c).
- 26 • Proposals will be considered only if the products offered have fixed or relatively
27 stable prices (§ 69f).
- 28 • Proposals will be considered only if their costs, on a levelized basis per MWh,
29 are less than 125 percent of the reasonably estimated market price of conventional
30 resource alternatives (§ 69g).
- 31 • APS will recover the costs of the renewable energy via the power supply adjustor
32 and the Environmental Portfolio Standard adjustable surcharge. In particular, the
33 only costs recovered through the EPS surcharge would be cost premiums, if any,
34 above market price for EPS-eligible resources that do not exceed the EPS
35 requirements and whose premiums do not exceed EPS funding. All other costs
36 would be recovered through the power supply adjustor (§§ 69 h, i, j).
- 37 • Net proceeds from the sale of any environmental credits or tags attributable to the
38 renewable resources shall be credited to the EPS account (§ 69k).
- 39 • APS will allow comments on its draft request for proposals before sending out the
40 request to potential bidders (§ 70).
41
42

43 Q. How much energy would APS obtain from 100 MW of renewable resources?
44

1 A. An 85 MW wind facility with a 32 percent capacity factor would produce about
2 238,000 MWh of energy per year.² Geothermal plants with 10 MW of capacity
3 would produce about 75,000 MWh of energy per year. Landfill gas projects in
4 Arizona may exhibit a capacity factor of about 50 percent, so a 5 MW landfill gas
5 project may produce about 22,000 MWh per year. If APS selected a mix of 85 MW
6 of wind capacity, 5 MW of landfill gas capacity, and 10 MW of geothermal capacity,
7 it would obtain about 335,000 MWh per year, for example.
8
9

10 Q. What is the relationship between resources acquired through the special request for
11 proposals and the EPS?
12

13 A. The resources obtained through the special acquisition process described above may
14 or may not be eligible to meet EPS requirements (§ 69d). If the resources are EPS-
15 eligible, they would count toward meeting APS' EPS goals (§ 69m).
16

17 Further, APS' obligations under the EPS are not modified by the special renewable
18 resource acquisition described above. APS will still have to meet EPS requirements
19 as they exist now and as they may be modified by the Commission (§ 72).
20
21

22 Q. Is the 100 MW renewable resource acquisition (and subsequent acquisitions to meet
23 10 percent of APS' increase in peak capacity needs) all that APS needs to adequately
24 hedge against high natural gas prices?
25

26 A. The 100 MW goal incorporated into the settlement agreement is a reasonable initial,
27 near-term objective. WRA anticipates that the Commission will consider
28 modifications to the existing EPS and that these modifications can address additional
29 goals for renewable energy, taking into account their hedge value, their
30 environmental attributes, their cost, and their availability (§ 68).
31
32

33 Q. Where would APS obtain the renewable resources to meet its obligations under the
34 settlement agreement?
35

36 A. To meet its goals under the settlement agreement, APS would be seeking
37 commercially available resources that could be deployed within about one year. The
38 most likely resources would be wind, biomass, and geothermal resources.
39

² Capacity factors of 32 percent have been achieved in other states. Arizona resources may not reach this level of production, however.

1 APS may obtain some or all of the resources from within Arizona. Arizona has the
2 potential to supply at least 2000 to 3000 MW of wind energy³ and may have some
3 additional near term biomass potential. APS may also seek resources from
4 neighboring states. New Mexico already has about 204 MW of wind resources and
5 has the potential to generate about 56 million MWh per year from wind resources
6 statewide.⁴ California has geothermal resources whose energy could be sold to APS.
7 Salt River Project is acquiring 25 MW of geothermal resources from a Salton Sea
8 facility in California starting in 2004.⁵

9
10 The settlement agreement encourages APS to seek in-state resources (§ 69l, subject to
11 § 69n) but does not require APS to obtain all the renewable resources from within
12 Arizona for two reasons:

- 13
14 a. Until APS receives price information from bidders, it is not known
15 whether in-state resources would be more costly. The cost impact of an
16 in-state requirement could be large. For example, if APS were required to
17 obtain only in-state resources and if those resources cost \$0.01 per kWh
18 more than comparable out-of-state resources, the extra cost borne by
19 ratepayers for 250,000 MWh per year would be \$2.5 million per year.
20 Further, in-state resources might exceed the cost cap while out of state
21 resources might cost less than the cap.
- 22 b. A restriction requiring APS to buy only in-state resources may conflict
23 with the commerce clause of the U.S. Constitution. A developer or
24 ratepayer may sue the Commission, thereby jeopardizing the renewable
25 energy program, and introducing uncertainty for APS and developers until
26 the issue is resolved. Recent natural resource cases concerning the
27 commerce clause, including Arizona cases, decided by either the Supreme
28 Court or the U.S. Court of Appeals indicate that restrictions on interstate
29 commerce to benefit local business at the expense of the national economy
30 are unlawful unless the restriction is the only feasible way to promote a
31 legitimate public purpose. In a recent review of these Supreme Court
32 decisions, an article in the *Harvard Environmental Law Review* concluded
33 that "the Court's avowed purpose is to prohibit 'economic protectionism,'
34 defined as 'regulatory measures designed to benefit in-state economic
35 interests by burdening out-of-state competitors'.... With only one
36 exception, the (Supreme) Court has invalidated every natural resource

³ Amanda Ormond, "Arizona Wind Energy Resource Potential," presentation to the Arizona Corporation Commission, June 25, 2004.

⁴ Land and Water Fund of the Rockies, Northwest Sustainable Energy for Economic Development, and Greeninfo Network, *Renewable Energy Atlas of the West*, Boulder, CO, 2002.

⁵ Salt River Project, "SRP's Proposed Sustainable Portfolio Six-Year Plan," February 2004, p. 11.

1 protection regulation that it has considered between 1978 and 2001 in the
2 context of a commerce clause challenge".⁶
3
4

5 Q. Is the price premium for renewable energy reasonable?
6

7 A. Yes. The agreement allows for a renewable energy price premium of 25 percent
8 above APS' estimate of market costs for conventional generation (§ 69g). This
9 premium and its associated cap serve three purposes. First, the 125 percent cap
10 allows renewable resources to be acquired while limiting APS' and ratepayers'
11 exposure to high renewable resource costs relative to conventional energy costs.
12

13 To put the premium in perspective, the market price for energy only from a gas-fired
14 combined cycle unit with an average heat rate of 8,000 Btu per kWh and a gas price
15 of \$6.18 per MMBtu⁷ would be \$0.04944 per kWh. Applying the premium, the
16 renewable resources would have to have an energy price less than about \$0.0618 per
17 kWh at current natural gas prices ($1.25 \times \$0.04944 = \0.0618). Renewable resources,
18 including intermittent resources, also have capacity value and APS will have to add
19 capacity values of specific resources to energy values to obtain the benchmark market
20 price (§ 69a).
21

22 Some resources are likely to beat the price cap. As indicated in my direct testimony,
23 recent contracts for wind energy have been at prices less than \$0.03 per kWh. When
24 interconnection costs, transmission costs, and wind integration costs (costs associated
25 with accommodating intermittent resources) are added in, the delivered price would
26 be about \$0.04 per kWh, which is clearly competitive. This price level assumes re-
27 instatement of the federal production tax credit. Without the production tax credit,
28 busbar costs might be around \$0.049 to \$0.052 per kWh (for Class IV and Class V
29 wind resources)⁸ plus about \$0.01 per kWh for interconnection, transmission, and
30 integration costs for a total of \$0.059 to \$0.062 per kWh which is still competitive.
31 Geothermal resources may cost about \$0.058 to \$0.081 per kWh⁹ and some of these
32 projects might be competitive with respect to the price cap, especially as capacity

⁶ Christine Klein, "The Environmental Commerce Clause," 27 *Harvard Environmental Law Review* 1, at 42 and 57.

⁷ This price is from the Energy Information Administration's estimate of 2004 gas prices paid by the electric power sector, *Short-Term Energy Outlook – September 2004*, Table 4. Note that the September 2004 gas price estimate is slightly higher than the August 2004 estimate used in Exhibits DB-5 and DB-6.

⁸ Western Resource Advocates, *A Balanced Energy Plan for the Interior West*, Boulder, CO, 2004, Appendix A.

⁹ Low value is average price paid by Sierra Pacific Power Company for geothermal energy as reported in its 2003 FERC Form 1. High value is estimate of levelized contract price paid by Imperial Irrigation District for geothermal energy from a Salton Sea project now under construction: John Sass and Sue Priest, "Geothermal California," *GRC Bulletin*, September/October 2002, pp. 183-187.

1 values are considered. Landfill gas projects in Arizona may cost about \$0.061 to
2 \$0.075 per kWh,¹⁰ so this technology may also be competitive, especially as capacity
3 values are included in the benchmark price. In sum, the premium is reasonable
4 because renewable resources are likely to be available at prices less than 125 percent
5 of market prices for conventional generation and because APS' and ratepayers'
6 exposure to high renewable energy costs is constrained.

7
8 Second, the 25 percent premium allows for implicit consideration of environmental
9 benefits of renewable resources – reduced emissions of carbon dioxide, sulfur
10 dioxide, and nitrogen oxides, depending on the conventional resources which are
11 displaced. My direct testimony discusses environmental benefits and their valuation.
12 Among these benefits is a reduction in APS' exposure to the costs of potential future
13 regulation of carbon dioxide emissions. The environmental costs of conventional
14 generation would not be included in the market analysis of conventional energy prices
15 developed in accordance with paragraph 69g, so the environmental benefits of
16 renewable energy can be considered to be included in the 25 percent premium
17 allowed by the settlement agreement.

18
19 Third, the 25 percent premium allows for uncertainty inherent in the estimate of the
20 long term market price of conventional resources prepared in accordance with
21 paragraph 69g. Gas prices are very unstable (Exhibit DB-5) and so APS might
22 misestimate the levelized cost of long term fixed price conventional energy resources.
23 Indeed, gas price forecasts have exhibited significant underestimates in the recent
24 past. Exhibit DB-6 shows Energy Information Administration Annual Energy
25 Outlook (AEO) forecasts made in earlier years for natural gas prices paid by US
26 electric generators.¹¹ Despite the detail and sophistication of the analyses, each
27 forecast was significantly below actual prices in future years. Because the acquisition
28 of renewable energy is intended to be a hedge against moderate and high gas prices, it
29 is reasonable to allow for uncertainty in determining the market price of conventional
30 generation.

31
32
33 Q. What happens if APS cannot acquire at least 100 MW of renewable resources for
34 delivery starting in 2006?

35
36 A. Under paragraph 71 of the settlement agreement, APS would have to report to the
37 Commission by January 31, 2007 if there is a shortfall. A shortfall could occur for
38 any of several possible reasons. For example, no resources might meet the cost cap.
39 Another circumstance might be that a developer is not be able to complete an

¹⁰ Estimated from data for SRP's Tri-Cities Landfill Project: *Salt River Project, Scope and Background Information for Participants in SRP's Sustainable Procurement Principles Development Process*, February 2004, p. 9, and *SRP's Proposed Sustainable Portfolio Six-Year Plan*, February 2004, p. 5. Estimate assumes a 50% capacity factor.

¹¹ Energy Information Administration, *Annual Energy Outlook 1996*, *Annual Energy Outlook 1999*, and *Annual Energy Outlook 2002*. Forecasts are reference case analyses.

1 otherwise desirable project by the end of 2006. Paragraph 71 enables the
2 Commission to examine the situation and decide what to do.
3

4 **Conclusions**
5

6 Q. Are the renewable energy provisions in paragraphs 69 through 72 of the settlement
7 agreement in the public interest?
8

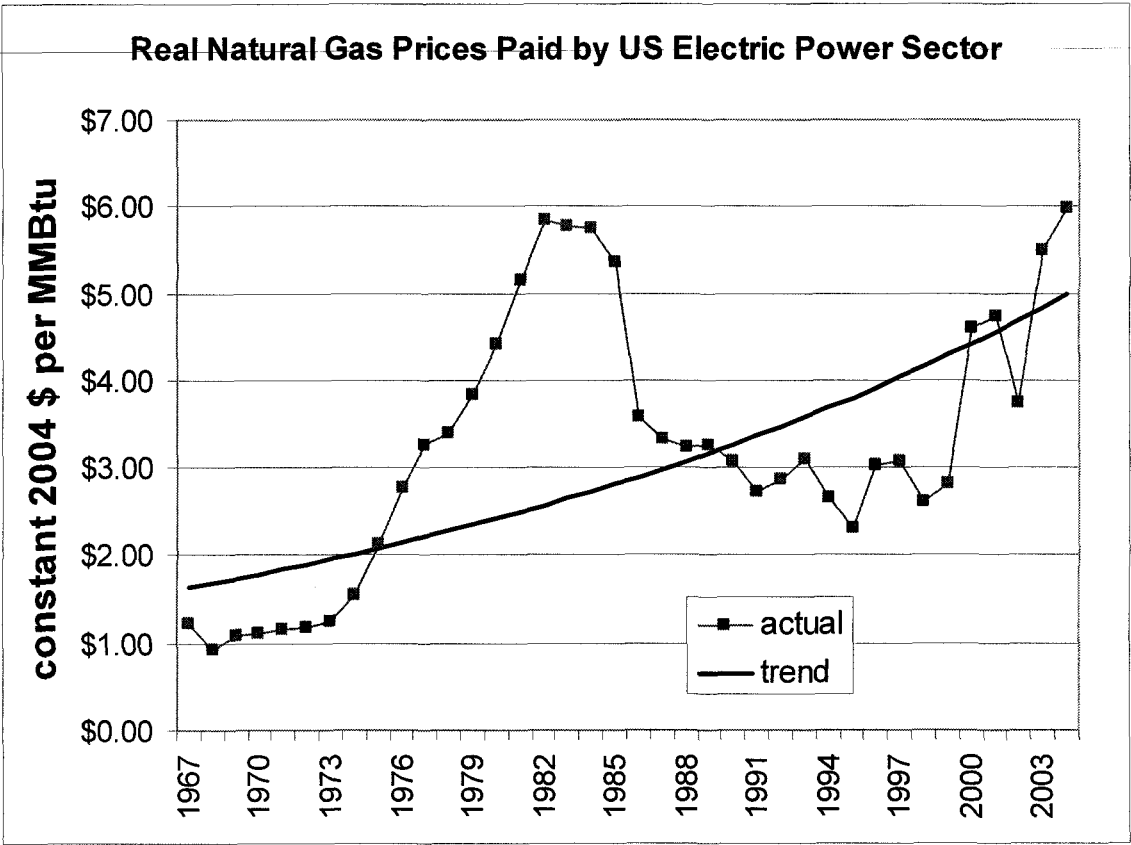
9 A. Yes. APS' acquisition of low cost, stably priced renewable energy resources will
10 enable it to hedge against moderate and high natural gas prices in an economic
11 manner and lower the price paid for electricity by retail consumers in periods of
12 moderate and high gas prices. The renewable resources will also reduce the volatility
13 of electricity prices and bring about environmental improvements.
14

15 More generally, the settlement agreement is a sea change.¹² Under the agreement,
16 APS will carry out larger scale demand side management programs and renewable
17 energy programs than it has in the past. As a result, APS' programs will lower the
18 costs of meeting the demand for electric energy services and economically hedge
19 against moderate and high gas prices.
20

21
22 Q. Does this conclude your testimony?
23

24 A. Yes.

¹² Full fathom five thy father lies; of his bones are coral made; those are pearls that were his eyes; nothing of him doth fade; but doth suffer a sea-change into something rich and strange. Shakespeare, The Tempest, Act I, Scene 2.



Forecast Error: Natural Gas Prices Paid by US Electric Generators

